

## REMARKS

The final office action of July 8, 2009 has been reviewed and its contents carefully noted. Reconsideration of this case, as amended, is requested. Claims 7 through 12 and 19 through 24 remain in this case, claims 19 through 24 being added and claims 7, 10 and 12 being amended by the present response. No new matter was introduced by these amendments. Specifically, the amendments to claims 7 and 12 are fully supported by page 18 line 27 through page 19, line 19 and page 21, lines 5-12 of the application, as filed. The amendments to claim 10 are fully supported by claim 10, as filed. New claim 19 is fully supported by page 18 line 27 through page 19, line 19 and page 21, lines 5-12 of the application and claim 12, as filed. New claims 20-24 are fully supported by claims 7-12, as filed.

The numbered paragraphs below correspond to the numbered paragraphs in the Office Action.

### **Rejections under 35 U.S.C. §112**

2. Claims 7-12 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Applicant respectfully disagrees with this rejection.

The Examiner states that the “wherein” clause in claims 7 and 12 is “vague because it would indicate to an artisan of ordinary skill that the system calculates an impulse response, inverse Fourier transform, and Fourier transform.” (present office action date July 8, 2009, page 2, lines 14-16).

Claims 7 and 12 have been amended to clarify the claims. The Fourier transform for calculating the impulse response is described in claims 7 and 12 in order to make the definition of the impulse response clear. The impulse response is defined in claims 7 and 12 as being previously calculated from an inverse Fourier transform of a transfer function which is based on a Fourier transform of normal-activity biosignals from normal biological activities. The impulse response calculated by the Fourier transform may be input to the systems of claims 7 and 12 and used by the calculating means in the system.

Claim 10 has also been amended to overcome the rejection. More specifically, claim 10 now includes the language “electrical stimulation means” and “stimulation means”.

Applicant believes that these amendments have fully addressed the Examiner’s rejections, and the claims are now in condition for allowance. Reconsideration and withdrawal of the rejection of claims 7-12 are respectfully requested.

#### **Rejection under 35 U.S.C. §103**

5. Claims 7 through 12 were rejected under 35 U.S.C. 103(a) as being unpatentable over Shalev (2006/0089678) in view of Constant (4,006,351). Applicant respectfully disagrees with this rejection.

Amended claims 7 and 12 each include, in part, “b) a calculating means which receives the input biosignals, calculates a plurality of stimulation signals for stimulation of an organism using a convolution integral between the input biosignals and at least one impulse response previously calculated from an inverse Fourier transform of a transfer function which is based on a Fourier transform of normal-activity biosignals from normal biological activities, and outputs the stimulation signals for stimulation of the organism” and “c) an organism stimulating means which receives the stimulation signals, and stimulates the organism based on the stimulation signals”. (emphasis added).

As the Examiner acknowledges, Shalev does not teach or suggest stimulation signals that are calculated from a convolution integral between an impulse response previously calculated and input biosignals. Since Shalev does not teach or suggest the stimulation signals, as defined in claims 7 and 12, Shalev also can not teach or suggest receiving those stimulation signals, and stimulating the organism based on the stimulation signals.

Regarding claims 7 and 12, Constant does not provide what Shalev lacks. Constant teaches “[i]n a recursive (zeros and poles) filter having input and output signals  $y$  and  $y_0$  and having impulse response  $h_r$ , apparatus and method for obtaining the convolution  $y_0 = y * h_r$  using either the convolution integral or using the discrete Fourier transform (DFT). When using the convolution integral the apparatus first computes the impulse response  $h_r$ , then obtains the response  $y_0$  in a convolver while when using the DFT the apparatus first computes the transfer

function  $H_i$  then obtains the frequency spectrum  $Sy_0$  of response  $y_0$ . By implementing the recursive filter as a matched clutter filter, the error normally associated with this type filter is minimized.” (Abstract)

“The problem at hand is to obtain a better measurement of the time delay and frequency relationships of signals  $y$  and  $x$  in a clutter environment. Such measurements are needed in applications involving the arrival of multiple closely spaced and overlapping signals  $y$  following transmission of a signal  $x$ , for example in radar, sonar, and communications applications and in applications involving the frequency response of a system under test, for example a communication line, an amplifier and so forth. In such applications the measurement of the impulse response  $h$  and its transfer function  $H$  ...” (col. 5, lines 37-48, see also [Equation 14] in patent, col. 5, lines 50-51)

Constant teaches calculating an impulse response  $h_r$  and calculates a response  $y_0$  in a convolver to obtain a better measurement of the time delay and frequency relationships of signals in a noisy environment. However, the teachings in Constant are very different from what is being claimed in claims 7 and 12 of the present application.

Constant does not teach or suggest biological responsiveness. Constant does not teach input biosignals or using input biosignals as part of a convolution integral because Constant does not teach or suggest any type of biological system in which to use its teachings. Instead, Constant discusses using these measurements and calculations in radar, sonar, and communication applications, or in communication lines or amplifiers. “Impulse response” in Constant refers to a response in a linear time-invariant system. The impulse response in Constant is based on the assumption that the relationship between the input signal and the output signal is linear and time-invariant.

However, biological responsiveness is nonlinear and varies with time. In addition, other factors in the organism (for example, hormones in the organism, body temperature and oxygen concentration) besides the input signals and output signals may influence the response. In other words, the output signal obtained by the impulse response is only an estimated value and varies with times and conditions.

Therefore, the impulse response in Constant would not be applied to an organism by someone skilled in the art because of the uncertainties. Biological responsiveness, expressed as a linear impulse response, cannot be similarly applied to different organs of the organism because a linear impulse response would not work as an approximation in all organs. For instance, whether an estimated value of the obtained impulse response can be used well enough for controlling the organism depends on the organs, since the nonlinear nature and the other elements also have influence on the output calculated by the impulse response at various levels.

Those skilled in the art would not use Constant's impulse response or calculations in a system that includes biological responsiveness. In addition, since Constant's teachings are necessitated by a linear system and Shalev teaches a biological system, which is nonlinear, no one skilled in the art would modify Shalev's teachings with the teachings from Constant.

The invention of claims 7 and 12 are characterized in that a signal for stimulation is output by a convolution integral between the impulse response (biological responsiveness) from normal biological activities and input biosignals obtained from a complex organism. As shown in examples in the application, control of the organism is possible with the system of claims 7 and 12. This control would not be possible using the teachings of Shalev and Constant, alone or in combination.

Since claims 7 and 12 include multiple elements not taught or suggested by Shalev or Constant, alone or in combination, claims 7 and 12 are not obvious over Shalev in view of Constant. Claims 8-11, being dependent and further limiting claim 7, should also be allowable for that reason, as well as for the additional recitations they contain. Reconsideration and withdrawal of the rejection are respectfully requested.

### **Conclusion**

Applicant believes the claims, as amended, are patentable over the prior art, and that this case is now in condition for allowance of all claims therein. Such action is thus respectfully requested. If the Examiner disagrees, or believes for any other reason that direct contact with Applicant's agent would advance the prosecution of the case to finality, he is invited to telephone the undersigned at the number given below.

"Recognizing that Internet communications are not secured, I hereby authorize the PTO to communicate with me concerning any subject matter of this application by electronic mail. I understand that a copy of these communications will be made of record in the application file."

Respectfully Submitted:  
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Dated: September 30, 2009